without stint.

The special quality of his gifts, when combined with the highly constructive mood of the scientific community in the two decades that followed World War II, made him one of the most influential scientists of our time. He enjoyed his role as a celebrity in a warmly human way, and he deeply believed that his gifts belonged primarily to the service of society. In this service he drove himself to his limits and, in doing so, achieved a high level of nobility.

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Solomon Pikel'ner

Solomon Borisovich Pikel'ner, professor of astronomy at Moscow University, died on 19 November at the age of 56. Pikel'ner graduated from Moscow University in 1944, and at the Crimean Astrophysical Observatory, which replaced the war-ravaged Simeiz branch of the Pulkovo Observatory, he soon began work directly under the eminent Soviet astronomer G. A. Shain.

In the most general sense Pikel'ner's speciality was plasma astrophysics. Throughout his career he was interested in two forms of plasma: the solar atmosphere and the interstellar medium. He would return repeatedly to topics he had considered before, each time penetrating more deeply into their physical meaning.

In the late 1940's Pikel'ner had already demonstrated the importance of thermostatic effects in the solar corona. Subsequently he gave interpretations of coronal heating and dissipation, as well as spicules and the chromospheric network, and he devised the most plausible theory of prominences. In his last research he had advanced far toward an understanding of flares. Pikel'ner was in effect the first to portray the overall pattern of solar activity.

Pikel'ner achieved equally important results with gaseous nebulae and the interstellar medium. He pioneered the explanation of filamentary nebulae as supernova remnants. As early as 1950 he had developed a theory for the emission of these objects, involving the propagation of a strong shock wave through the interstellar medium, and he gave a clear account of the complex physical processes occurring behind the shock front.

Pikel'ner was the first to recognize the importance of galactic cosmic rays in the physics of the interstellar medium. He introduced the idea of a halo, a more or less spherical region filled with relativistic particles and surrounding the galaxy. Long afterward he adopted an entirely new approach to the thermal equilibrium of H I regions in the interstellar medium, taking the soft cosmic-ray component and x rays as the chief mechanisms for heating the gas. Pikel'ner's work inaugurated the modern theory of thermal instability in the interstellar medium.

He also studied the Crab Nebula in a unique series of researches. He was the first to note the dynamical effect whereby cosmic rays trapped in the Crab accelerate the expansion of its filaments.

The scientific work of Pikel'ner was singular in that he would never write papers on "fashionable" topics in astronomy. He used to say that he disliked writing papers where priority depended on who was the first to receive the preprint with the latest observational data. He preferred to deal with problems offering adequate observations to analyze, so that he could model the phenomenon and not just propose an alternative hypothesis. This is why so much of Pikel'ner's work has not only maintained its significance but become more valuable with time.

Here was a remarkable man, good-natured and most sympathetic. The tremendous help he has extended to several generations of Soviet astronomers is beyond measure.

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(Translated by Freeman J. Dyson and Richard B. Rodman)

Francis W. Sears

Francis W. Sears, one of the most talented physics teachers and textbook authors of our generation, died suddenly on 12 November at the age of 77. As a member of the physics staff at the Massachusetts Institute of Technology from about 1925 to 1955, and as professor of physics at Dartmouth College from 1955 to 1964, he influenced countless students in their first years of preparation for careers in physics, chemistry and engineering. His lectures were models of clarity, and the demonstrations, many of them original, were meticulously prepared and performed. He was one of the very few teachers who not only spoke slowly and loudly enough to be heard in the back of the lecture theater but also wrote on the blackboard with symbols and figures large enough to be seen by those in the back of the hall. As one student put it, "He was a wonderful explainer."

Sears' life was full of satisfaction and success. Stimulated by the lectures of Peter Debye on a visit to MIT, Sears collaborated in a series of experiments showing that the density variations in a sinusoidal ultrasonic wave in a liquid serve to diffract light in a manner similar to that of a plane transmission grating. Their work was published in 1932, and the phenomenon is now known as the Debye–Sears effect.

In the mid-1940's Sears conceived the idea of a set of textbooks covering the entire field of college physics, suitable for a two-year course in which elementary calculus would be used sparingly after about the fourth week, and then more and more frequently until it was used freely in the second year. The set of texts was called *Principles of Physics* and was printed by a small company in Cambridge, Massachusetts known as the Addison–Wesley Press Inc. Due to the success of these books and many "one-year" versions of them that were prepared by a number of collaborators, the Addison–Wesley Publishing Company has become a large and important publishing house.

In later years, Sears focused his attention on two subjects that fascinated him: relativity and thermal physics. In 1968 he and Robert W. Brehme prepared a small introduction to the theory of relativity that was published by Addison–Wesley. The third edition of his text *Thermodynamics, Kinetic Theory and Statistical Thermodynamics*, written in collaboration with Gerhard L. Salinger, appeared only a few months before his death.

Sears was very active in the American Association of Physics Teachers and served as treasurer from 1950 to 1958 and as president in 1959. In 1962 he was awarded its highest honor, the Oersted medal. He was a familiar figure at AAPT meetings and will be remembered with honor and with affection by the incredibly large number of people whom he inspired and encouraged.

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Sidney L. Simon

Sidney L. Simon, senior associate consultant with Kensington Management Consultants Inc and a former physicist, died on 26 November at the age of 62. Simon received his PhD in physical chemistry from the University of Chicago in 1930. In 1943 he became head of the combustion research section of the National Advisory Committee for Aeronautics and became chief of the physics-of-solids branch in 1949. During 1946–49 he also held senior posts at Oak Ridge National Laboratory and Argonne National Laboratory.

Simon entered the field of management in 1955, when he became director of applied research at Avco Corporation. He held management positions at RCA Corporation and Sperry–Rand Corporation, and in 1966 he became